LMX-129
REARVIEW MIRROR
FOR MOTOR VEHICLES

Description

The invention concerns a rearview mirror, especially for motor vehicles in accord with the generic concept of Claim 1.

DE 198 40 004 A1 discloses a rearview mirror for motor vehicles, in which the mirror support element is a carrier plate with a honeycomb structure. The mirror housing with the mirror framing, the mirror element with its pane and the adjustment apparatus is fastened to this carrier plate. The carrier plate with the said honeycomb structure is secured to a holder by means of a clamping mechanism and the holder, in turn, is attached to the body of the vehicle. A mirror of this type possesses a high degree of stability, a relatively low weight, and only a small tendency toward vibration.

A comparable mirror arrangement has been made known by EP 0 590 510 A1 and DE 40 10 083, which, likewise, each exhibit a carrier plate as the carrying element, but in which no honeycomb structure is to be found.

A disadvantage of this type of mirror arrangement is found therein, in that the version of EP 0 590 510 A1 possesses a comparatively high weight.

The purpose of the present invention is to so improve the known rearview mirror of DE 198 40 004 A1, that it is provided with a lighter structure, but which, at the same time, exhibits necessary stability.

The achievement of this purpose is accomplished through the features of Claim 1.

In a manner similar to that of the state of the technology, in the case of the present invention, the rearview mirror is secured to a holder, i.e. a holding tube, by means of a first and a second clamping component. The clamping bracket can be screwed to the mirror housing framing. Another possible fastening means is by riveting.

Since the first clamping part is the mirror housing framing and the second clamping part is the clamping bracket itself, onto which the mirror element is fastened, a carrier plate may be dispensed with. Removing a carrier plate, which plate is conventional in the state of the technology, leads to a reduction in weight.

Since no carrier plate is required anymore, again in comparison to the state of the technology, the number of the system parts or components is reduced, which results in a simpler mounting procedure and also reduces the costs of manufacture.

In accord with an advantageous embodiment of the present invention as stated in Claim 2, the clamping bracket is made out of a more rugged material than is the mirror housing framing, so that the said bracket becomes the essential carrying part of the construction. On to the bracket, as the carrying component, the characteristic mirror pane is fastened along with the positioning apparatus. Since, for the clamping connection, the entire extent of length or width of the mirror housing framing stands available, the clamping bracket can now be fashioned essentially in a large surface mode, so that it is possible to manufacture the said clamping bracket from a reinforced plastic, that is, glass fiber reinforced plastic. Alternatively, the clamping bracket can naturally be made of metal (in this connection, see Claim 3).

In accord with a preferred embodiment of the invention, as shown in Claim 4, the clamping bracket fits into one side of the mirror framing with slip-in catches, and is screwed into the said mirror framing on the other side. This type of connection reduces the number of screwed connections and simplifies the mounting.

Following another advantageous embodiment of the invention, according to Claim 5, the mirror element includes a mirror pane, upon which a glass carrier plate is installed, which carrier plate is driven by a motor, preferably electric, for positioning adjustment. The positioning adjustment itself, and thereby the entire mirror element, are screwed onto the reinforced clamping bracket which acts as the carrying element. This too contributes to simplifying the mounting.

In accord with yet another advantageous embodiment of the invention, in keeping with Claim 6, a rimless glass carrier plate is employed, which allows the mirror pane to extend slightly beyond the said glass carrier plate and the carrier plate. Thus the glass carrier plate possesses no border or peripherally running rim which encloses the glass pane of the mirror. By means of dispensing with the enclosing rim for the glass carrier plate, with an outside design of the same dimensioning, optimum use is made of the glass area.

In accord with yet another advantageous embodiment of the invention, as described in Claim 7, the mirror housing includes a mirror housing cover, which is releasably bound, or can be so bound, to the mirror housing framing by means of a snap-in connection. Since the mirror housing cover plate fulfills no carrying function, this may be manufactured very thin walled and light in weight. By means of the snap-in connection, the said cover plate can be easily disconnected and can also be lacquered in a simple manner with colors specified by the customer.

In a further advantageous embodiment of the invention, in accord with Claim 8, the clamping bracket and/or the mirror framing in the area, in which the holding part is located, engages securements in the form of projections or grooves, in/on complementary, respective grooves or projections on the holding tube. In this way, not only is the said slip-in clamping connection still available, but also a form-fit connection to the holding part is created.

In accord with yet another embodiment of the invention, following Claim 9, the clamping bracket possesses an opening. By corresponding arrangement of the said recess, the achievement may be gained, that when the mirror housing cover is removed, the adjustment apparatus is accessible through said opening. One advantage of this is that wiring to the position adjustment apparatus can be run through this said opening.

Further details, features and advantages of the invention arise from the following description of preferred embodiments, with the aid of the drawings. There is shown in:

Fig. 1 a side view of a first embodiment of the invention,

Fig. 2 a sectional drawing along the section line A-A of Fig. 1,

Fig. 3 a sectional drawing along the section line B-B of Fig. 1,

Fig. 4 a plan view of the mirror housing framing seen from the front,

Fig. 5 a side view of a second embodiment of the invention, and

Fig. 6 a view such as in Fig. 2 of a third embodiment of the invention.

The Figs. 1 to 4 show a first embodiment of the invention in various presentations. Fig. 1 shows a side view, depicting a mirror housing 2, which comprises a mirror housing framing 4 and a mirror housing cover 5. In the mirror housing 2 is a placed a mirror element 6. The entire rear view mirror is fastened by means of a clamping connection 8 on a holder tube 2. The clamping connection 8 comprises a first clamping part in the form of the said mirror housing framing 4 and a second clamping part in the form of a clamping bracket 12.

As may be inferred from the sectional drawings in Fig. 2 and 3, the mirror housing framing 4 possesses a trough-like recess 14 within which the holder tube 2 is partially encased. The clamping bracket 12 possesses a similar trough-like recess 16. Thus, as a result of the double, opposed trough-like structures 14, 16, the holder tube 10 is nearly completely circumferentially encased, and a large surface is made available for the transmission of forces. Away from the described trough structure 16 of the holding tube, extend, in a comblike fashion, a plurality of hook elements 18. On the other side of the trough structure 16 extends a part 20 of the bracket 12 with provision for screw fastenings. The hook elements 18 fit into a corresponding hook opening 22 in the mirror housing framing 4. As one can see in Figs. 2 and 4, the part 20 of the clamping bracket 12 is connected to the mirror housing framing 4 by means of four screw connections 24.

Fig. 3 shows, that the mirror element 6, inclusive of a mirror pane 30, a glass carrier plate 32 and a electric motor driven mirror positioning apparatus 34, is connected to the clamping bracket 12. In this way, the mirror adjustment apparatus 34 is fastened onto the piece 20 of the clamp bracket 12. In accomplishing this, the mirror positioning apparatus 34 is screwed onto the part 20 of the clamping bracket 12 by means of four screw connections 26.

The four screw connections 26, i.e. screws, enter the part 20 of the clamping bracket 12 (in Fig. 3) from the side proximal to the mirror pane 30. The glass carrier plate 32, with its attendant mirror pane 30 is fastened onto the mirror positioning apparatus 34 by means of a detent connection 36. The glass carrier plate 32 is without a surrounding rim construction, as has been made known in EP 0 659 609 B1, and the mirror pane 30 extends slightly outward beyond said glass carrier plate 32. To this extent, acknowledgment is made in completeness to the EP 0 659 609 B1.

Fig. 4 shows a view of the mirror housing framing 4 from the front, without the mirror element 6. The mirror housing framing 4 possesses three openings 38 for internal installation purposes and for weight reduction. The somewhat rectangular clamping bracket 12 exhibits in its screwed-on part 20 an opening 40, which overlaps the central opening 38 in the mirror housing framing 4. In the remaining upper and lower edge strips 42, 44, are provided the four screw connections 26 for the screw connection of the clamping bracket with the mirror housing framing 4. On the upper and the lower edge strips 42, 44, are respectively the four screw connections 24 for the screw connection of the mirror positioning adjustment apparatus 34 to the clamping bracket 12.

When the mounting of the mirror takes place, first the clamping bracket 12 is pushed into the snap connections of the mirror housing framing 4. Subsequently, the holding tube 10 is clamped between the clamping bracket 12 and the mirror housing framing 4, and the clamping bracket 12 is screw attached to the mirror housing framing 4 from the back side of the mirror assembly forward *[see Fig. 2]* by screws 24. Thereafter, from the front position, the mirror positioning apparatus 34 is screwed onto the extensions 48 of the clamping bracket 12 by screw connections 26. Following this, the glass carrier plate 32 with the mirror pane 30 is fastened onto the mirror positioning apparatus 34 by means of the detent connections 36. Finally, the mirror housing cover 5 is snapped onto the mirror housing framing 4.

In the case of the embodiment in accord with Figs. 1 - 4, the connections, more closely defined as screw connections, between, first, the mirror housing framing 4 and the clamping bracket 12 and second, the mirror element 6, that is, more exactly the mirror positioning apparatus 34 are made by means of two independent sets of screws.

Alternative to this, but not shown, the mirror positioning apparatus 34, the mirror housing framing 4 and the clamping bracket 12 can also be bound togther by a screw connection common to all.

Fig. 5 shows a second embodiment of the invention, in side view, similar to the presentation of Fig. 1. This second embodiment of the invention differs from the first embodiment, in that the holding element is not a continuous holding tube, but is rather constructed as a two-piece holding component with a first and a second holding arm 50 and 52. In this case, the first holding arm 50 is secured by the upper edge strip 42 of the clamping bracket 12 and the second holding arm 52 is secured by the lower edge strip 44 of the said clamping bracket 12. Otherwise, the construction of the second embodiment agrees in all details with the first embodiment.

Fig. 6 shows a third embodiment of the invention in a drawing similar to Fig. 3. The third embodiment differs from the first or the second embodiment essentially therein, in that the connection between the holding parts 10, 50, 52 and the clamping bracket 12 are not made as auxiliaries to the clamping connection by means of a form-fit binding. In this case, in the trough-like recesses 14 and 16, additional projections 56 are provided which fit into complementary recesses 58 in the holding parts 10, 50 and 52. By this means, the mirror is secured additionally against rotational displacement on the holding elements 10, 50, 52. Additionally or alternatively, – not shown – in the holding parts 10, 50, 52, projections can be provided, which engage in corresponding recesses in the trough shaped recesses 14 and 16.

The mirror housing framing 4 and the mirror housing cover 5 are advantageously made of acrylonitrile butadiene styrene (ABS). The clamping bracket 12 advantageously is manufactured from glass fiber reinforced plastic, polyamide (PA 6.6) glass fiber (GF 35). The glass carrier plate 32 is advantageously made of ABS with a 30 % portion of glass fiber and possesses a thickness in a range between 1 and 1.5 mm. The wall thickness of the remaining components varies within the limits of 2 and 2.5 mm. By means of these measures, weight and cost reductions are achieved. Furthermore, the vibration tendencies are also reduced.

In certain cases, it can also be advantageous , to reinforce the trough shaped recess 14 and the area of the screw connections 24 of the mirror housing framing 4 by means of an inlay of reinforced material or to make these areas out of glass fiber reinforced plastic.

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Reference number list

2	Mirror housing
4	Mirror housing framing
5	Mirror housing cover
6	Mirror element
8	Clamping connection
10	Mirror holder, i.e. mirror holding tube
12	Clamping bracket
14	Trough-like recess (in 4)
16	Trough-like recess (in 12)
18	Hook elements
20	Part for screw fastening
22	Hook opening
24	Screw connection between 12 and 4
26	Screw connection between 12 and 34
30	Mirror pane
32	Glass carrier plate
34	Mirror position adjustment apparatus
36	Detent
38	Opening in 4
40	Opening in 12
42	Upper edge strip of 12
44	Lower edge strip of 12
48	Extensions on 42 and 44
50	A first holding arm
52	A second holding arm
56	Projections in 14, 16
58	Recesses in 10, 50, 52

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